

CLAIMS

What is claimed is:

1. A parser program to parse mathematical optimization problems, wherein a geometric program is converted from a set of algebraic expressions to a compact numeric format that can be accepted by a computer-based geometric program solver.
2. The parser of claim 1, wherein said geometric program is comprised of an objective and a set of one or more constraints.
3. The parser in claim 2, wherein:
 - said objective includes an expression of one or more mathematical terms; and
 - each constraint in said set includes either an inequality or equality of one or more mathematical terms.
4. The parser in claim 3, wherein:
 - each mathematical term includes one or more optimization variables.
5. A computer-implemented method of parsing a mathematical optimization problem comprising:
 - reading a plurality of algebraic expressions that represent a mathematical optimization problem, each algebraic expression in said plurality having one or more mathematical terms;
 - creating a set of signomial expressions by converting each of said mathematical terms to a signomial; and

7 converting said set of signomial expressions to a compact numeric format to be accepted
8 by a computer-based geometric program solver.

1 6. The method of Claim 5, wherein said algebraic expressions include an objective and a set
2 of one or more constraints.

1 7. The method in claim 6, wherein:
2 said objective includes an expression of one or more mathematical terms; and
3 each constraint in said set includes either an inequality or equality of one or more
4 mathematical terms.

1 8. The method in claim 7, wherein:
2 each mathematical term includes one or more optimization variables.

1 9. The method of Claim 5, further comprising:
2 prior to said converting, determining that all signomial expressions in said set reduce to
3 either a posynomial objective, a posynomial inequality or a monomial inequality;
4 after said determining, identifying that said mathematical optimization problem is a
5 geometric program.

1 10. The method of Claim 5, further comprising:
2 prior to said converting, determining that at least one of said signomial expressions in
3 said set cannot be reduced to either a posynomial objective, a posynomial inequality or a
4 monomial inequality;

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after said determining, reporting to a user which of said signomial expressions in said set cannot be reduced to either a posynomial objective, a posynomial inequality or a monomial inequality.

11. The method of Claim 10, further comprising the step of:
simplifying each signomial expression in said set by mathematically canceling a combination of a plurality of said signomials.

12. A computer-implemented method of parsing a mathematical optimization problem comprising:
reading a plurality of algebraic expressions that represent a mathematical optimization problem, each algebraic expression in said plurality having one or more mathematical terms;
identifying that said algebraic expressions form a geometric program; and
converting said plurality of algebraic expressions to a compact numeric format to be accepted by a computer-aided geometric program solver.

13. The method of Claim 12, wherein said algebraic expressions include an objective and a set of one or more constraints.

14. The method in claim 13 wherein:
said objective includes an expression of one or more mathematical terms; and
each constraint in said set includes either an inequality or equality of one or more mathematical terms.

1 15. The method in claim 14, wherein:

2 each mathematical term includes one or more optimization variables.

1 16. The method of claim 12, further comprising:

2 prior to said identifying, creating a set of signomial expressions by converting each of
3 said mathematical terms to a signomial; and

4 after said creating, determining that all signomial expressions in said set reduce to either
5 a posynomial objective, a posynomial inequality or a monomial inequality.

1 17. The method of Claim 16, further comprising:

2 prior to said identifying, determining for each algebraic expression in said plurality that a
3 mathematical combination of said mathematical terms form either a posynomial objective, a
4 posynomial inequality or a monomial inequality.

1 18. A computer-readable medium for parsing a geometric program comprising:

2 a user interface to accept a plurality of algebraic expressions that represent a
3 mathematical optimization problem, each algebraic expression in said plurality having one or
4 more mathematical terms;

5 an expression verifier coupled to said user interface to identify that said algebraic
6 expressions form a geometric program; and

7 a matrix generator coupled to said to expression verifier to convert said plurality of
8 algebraic expressions to a compact numeric format to be accepted by a computer-aided
9 geometric program solver.

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1 19. The computer-readable medium of Claim 18, wherein said algebraic expressions include
2 an objective and a set of one or more constraints.

1 20. The computer-readable medium in claim 19, wherein:
2 said objective includes an expression of one or more mathematical terms; and
3 each constraint in said set includes either an inequality or equality of one or more
4 mathematical terms.

1 21. The computer-readable medium in claim 20, wherein:
2 each mathematical term includes one or more optimization variables.

1 22. The computer-readable medium of Claim 18, further comprising:
an expression reducer to simplify each algebraic expression of said plurality by
mathematically canceling a combination of a plurality of said mathematical terms.

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